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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.          | CONFIRMATION NO. |
|--|-------------|----------------------|------------------------------|------------------|
| 10/043,812   | 01/10/2002  | Satoshi Seo          | 07977-292001-US5444          | 7853             |
| 26171  | 7590        | 10/28/2003           |                              |                  |
| FISH & RICHARDSON P.C.<br>1425 K STREET, N.W.<br>11TH FLOOR<br>WASHINGTON, DC 20005-3500 |             |                      | EXAMINER<br>KRISHNAN, SUMATI |                  |
|  |             |                      | ART UNIT<br>2875             | PAPER NUMBER     |

DATE MAILED: 10/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 10/043,812             | SEO ET AL.          |  |
|                              | <b>Examiner</b>        | Art Unit            |  |
|                              | Sumati Krishnan        | 2875                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### ***Office Action Summary***

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If no period for reply is specified above, the normal statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to timely file a reply or extension of a period for reply will, by statute, cause the application to become ABANDONED (37 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1)  Responsive to communication(s) filed on \_\_\_\_\_.  
2a)  This action is **FINAL**.                    2b)  This action is non-final.  
3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## **Disposition of Claims**

4)  Claim(s) 1-59 is/are pending in the application.

4a) Of the above claim(s) 56-59 is/are withdrawn from consideration.

5)  Claim(s) \_\_\_\_\_ is/are allowed.

6)  Claim(s) 1-54 is/are rejected.

7)  Claim(s) \_\_\_\_\_ is/are objected to.

8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)  The proposed drawing correction filed on \_\_\_\_\_ is: a)  approved b)  disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.

12)  The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)  All b)  Some \* c)  None of:

1.  Certified copies of the priority documents have been received.
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14)  Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a)  The translation of the foreign language provisional application has been received.

15)  Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1)  Notice of References Cited (PTO-892) 4)  Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_  
2)  Notice of Draftsperson's Patent Drawing Review (PTO-948) 5)  Notice of Informal Patent Application (PTO-152)  
3)  Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_. 6)  Other: \_\_\_\_\_

**DETAILED ACTION**

***Election/Restrictions***

During a telephone conversation with John Haydn on 10/2/2003, a provisional election was made without traverse to prosecute the invention of group I, claims 1-54. Affirmation of this election must be made by applicant in replying to this Office action. Claims 55-59 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I.      Claims 1-55, drawn to light emitting device, classified in class 313, subclass 506.
- II.     Claims 56-59, drawn to method of manufacturing, classified in class 445, subclass 26.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process, for example without heat treatment.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-25,30-31,36-37, and 42-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al (US 6130001).

Regarding claims 1, 4-9, 24-25, and 42-43, Shi discloses a light emitting device comprising an organic light emitting element comprising an anode, a cathode and an organic compound film sandwiched between the anode and the cathode, wherein the organic compound film comprises at least two compounds selected from the group comprising a hole and electron transporting component, which change concentrations continuously throughout the region. The concentration of the electron transporting increase in the direction from anode to cathode, and the concentration of the hole transporting decrease in the direction from the anode to the cathode. See abstract. The two materials disclosed by Shi are capable of undergoing vacuum evaporation, and the organic compound film comprises a region in which the two compounds are mixed (see abstract).

Shi doesn't specifically disclose the electric current versus electric voltage of the organic light emitting elements showing a rectification property. However, rectification is an innate property of the pn junction characteristics of the organic element having the organic compound layer with a mixed region of a hole and electron transporting material. Therefore, it is obvious to

assume that the current vs. voltage characteristics of Shi's light emitting device would demonstrate rectification.

Regarding claims 2-3 and 22-23, Shi discloses the hosts being the electron and hole transport regions and the guest being the fluorescent powder.

Regarding claims 10-13, the light emitting dye or pigment is incorporated into the entire organic layer giving the entire organic layer a light emitting property. Therefore, both the first and the second organic compounds also have a light emitting property.

Regarding claims 14-15, Shi discloses the first or second organic compound to include an aromatic amine (col. 4 ln 35), since the hole transporting layer can be considered the first organic compound and the electron transporting layer can be considered the second organic compound, or the electron transporting layer can be considered the first organic compound layer and the hole transporting layer can be considered the second.

Regarding claims 16-21, Shi discloses the first and second organic compounds to be as claimed, see Shi column 4 lines 15-35.

Regarding claims 30-31, triplet excitation state is a property of the organic material material used for excitation. Some materials exhibit singlet (fluorescence) excitation and some triplet (phosphorescent) excitation. Since Shi discloses the same materials for the light emitting materials as claimed by applicant, it is obvious that the excitation states would also correspond.

Regarding claims 36-37, since the third organic material in this case is the light emitting material, the energy difference between its highest and lowest unoccupied molecular orbit is going to be larger than those of the electron and hole transporting mediums.

Regarding claims 44-54 Shi discloses an aluminum compound as a hole transport or electron transport material whose concentration changes continuously throughout the organic layer. The aluminum compound could be considered either the first second or third organic compound and doesn't refer to anything in particular antecedently.

Claims 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al (US 6130001) in view of Kishimoto et al (US 6368730). Shi discloses the light emitting device of claims 22 and 23 but does not disclose the third organic compound (the light emitting material) being of a metal complex as claimed in these claims. However, it is well known in the art for the fluorescent material to be of a quinoline structure as disclosed in Kishimoto. Kishimoto discloses that the quinoline metal complex has a high fluorescence and the materials disclosed satisfy that claimed in claims 26-29. See Kishimoto column 7 lines 9-20.

Claims 32-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al (US 6130001) in view of Adachi (US 6458475).

Shi discloses the light emitting device of claims 22 and 23 but does not disclose the third organic compound (the light emitting material) being of a material as claimed in these claims. However, it is well known in the art for the material of the light emitting layer to be iridium and the compound in claims 34-35 are also well known, as shown by Adachi. Adachi discloses the light emitting material to be of iridium and the compound to match what it is claimed, see column 4 lines 48- 50.

Claims 38-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al (US 6130001) in view of Schoo (US 6326091). It is well known in the art for the light emitting material to be an oxadiazole derivative, as shown by Schoo. Schoo discloses the third organic compound (light emitting material) to be oxadiazole derivative and to be one of the compounds of claims 40-41. See Schoo column 4 lines 5-25.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sumati Krishnan whose telephone number is 703-305-7906. The examiner can normally be reached on 8:00 am - 4:30 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on 703-305-4939. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

SK

A handwritten signature in black ink, appearing to read "SK" followed by a stylized surname.